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"Is Yellow Fever Endemic in Jamaica?"

A Paper read before the Jamaica Branch of the
British Medical Association, December, 1912.

—BY—

ANGUS MACDONALD,

M.D., Edinburgh; D.P.H., Manchester; D.T.M., Liverpool.

MEDICAL OFFICER OF HEALTH

—FOR—

KINGSTON, JAMAICA.

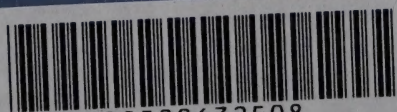
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GENTLEMEN,

It lies with the Medical Profession of Jamaica to deal with the Report of Captain Potter on "Vomiting Sickness." No matter what private opinion we may individually hold as to the value of the Report and the accuracy of its evidence, it nevertheless has received the imprimatur of the Colonial Office in Downing Street and the Encomiums of the Advisory Committee on Tropical Diseases.

The reply of His Excellency the Governor evidently based on the advice of his medical staff is on the whole wise and pointed.

The parallel publication of four cases of Vomiting Sickness diagnosed clinically as Cerebrospinal Fever and proved Bacteriologically by the Government Pathologist, does not go far as a criticism of the Report of Captain Potter.

If the suggestion is that all Vomiting Sickness is Cerebrospinal Meningitis, the case wants proving with much work and after careful eliminative investigation.

What *should* be proved as far as the negation of proof is possible, is that Yellow Fever is not Endemic in Jamaica—and it behoves the whole medical profession to assist that proof and so remove the Commercial and Hygienic Stigma that has been long suspected and now has been officially cast on the Island in a far from Scientific Report.

Since Sir Rupert Boyce demonstrated (as I believe) the endemicity of Yellow Fever in West Africa, those of us from home have come out with the impression that it may still be Endemic here.

It might reasonably on the evidence of the Report itself be asserted of Captain Potter that he came out with that impression and proceeded to use all facts inclining towards his assumption as facts to demonstrate it.

I believe he has lamentably failed, and the absence of Yellow Fever from Jamaica all the more should be proved.

The Summing up of the Report of Capt. Potter is in the following words :—

“It is my opinion that there is no justification for the Argument of Report. use of the term Vomiting Sickness. It is not a separate Clinical Entity—and I am of opinion that the majority of deaths ascribed to the so-called Vomiting Sickness are due to Yellow Fever.”

As regards the use of the term Vomiting Sickness, it Justification of term Vomiting Sickness. may reasonably be admitted that though the term has little scientific value since it undoubtedly is loosely applied to various diseases of which Vomiting is a pronounced Symptom, yet there may be advantage in its use until investigation definitely disentangles the separate Clinical Entities embraced within the term.

And I propose to demonstrate by analysis of the Report Other Possibilities not excluded. of Captain Potter that that has not yet conclusively been done.

In other words I am of opinion that Captain Potter has Evidence Incomplete. brought forward no evidence in his Report to justify the definite conclusion above quoted.

Out of 73 cases personally investigated by Captain Potter Analysis of cases Investigated. (70 in numbered schedule which should be 71 (43 is duplicated) and 2 seen with Dr. Turton) 35 are admittedly cases of some other condition than Yellow Fever; while of the 38 left for probable consideration there is not one case which clinically and from post mortem evidence is a typical case of Yellow Fever.

This absence of any typical case is against the weight of Absence of any Typical Case of Yellow Fever. opinion of authorities who have observed and written on Yellow Fever (vide Boyce, Lectures; Lebrede, Yellow Fever Bulletin, January, 1912, Seidelin, *ibid* et seq.).

There is no evidence in the Report that local circumstances and surroundings have been considered. A Great variety of Factors not Investigated.

Situations are recorded; but whether urban, village, rural and isolated; what the nature of the immediate country—bush, grass, pasture, banana, &c.; what the occupation of the victims; their immediate home surroundings; state of personal hygiene; existence of overcrowding; keeping of animals on or about the premises, and the kind of animals; the presence of *Stegomyia*, *Anophelines*, and other insects, the various domestic vermin and the parasites of dog, pig, goat, sheep, horse, ox, mule—these and many other items absolutely necessary to be considered in a scientific investigation are absent.

No reference to Stegomyia Fasciata.

Most noteworthy perhaps is the entire absence of reference to the presence of Stegomyia Fasciata.

The frequency throughout the Island of the known necessary vehicle of Yellow Fever transmission is granted; but the proof of its presence and causative potentiality is demanded in relation to each case assumed to be Yellow Fever.

Various Clinical Entities embraced by the term Vomiting Sickness. Report makes no Record of Eliminating these others.

While reviewing briefly at the outset the various Clinical Entities assumed at various times and by various authorities to be embraced within the term "Vomiting Sickness," viz: Cerebrospinal Meningitis; Gastro Enteritis; Gastritis; Ackee poisoning; Cassava poisoning; Ptomaine poisoning; worms, &c.; the Report takes no pains to indicate in any case of the 38 not otherwise accounted for the reasons for the elimination from consideration of any of these entities or of others not adduced.

Ultimately in Appendix E, the Report selects but 17 of these 38 as cases which in the opinion of the Author "were cases of Yellow Fever". (p. 4.)

Difficulties of Investigation.

Owing to the nature of the investigation the symptoms detailed are scanty, and probably as abundant as circumstances permitted.

Faithfulness of Records.

There is every appearance that the recorded details of post mortem examination are faithful, and no charge of exaggeration to fortify a case can be made.

Analysis of Items of Report.

Tables are here produced analysing the cases of the Report more particularly than has been done in the Report; the Symptoms detailed, the Blood Examination, and the post mortem characteristics in the 17 cases definitely cited in support of the Conclusions of the Report are compared in parallel with the Symptoms and signs of Yellow Fever as given by Authorities, of Cerebrospinal Fever, and later with a group of diseases not yet suggested.

TABLE I.

CASES INVESTIGATED	-	-	73
CASES NOT INVESTIGATED—			
Malaria	-	-	16
Whooping Cough	-	-	4
Infantile Paralysis	-	-	1
Advanced Tubercule	-	-	1
Infantile Diarrhœa	-	-	1
Worms ("Santonin given")	-	-	1
Reported as "Vomiting Sickness"			
and not investigated	-	-	2
Well when seen—No definite Symptoms			9
			35
CASES PROBABLY YELLOW FEVER—			
No Diagnosis	-	-	21
Believed to be Yellow Fever	-	-	17
			38
			73
PROBABLE YELLOW FEVER			38
Recovered	-	-	17
Died	-	-	21
DECEASED PROBABLE CASES			21
Not Diagnosed	-	-	4
Called Yellow Fever	-	-	17

TABLE II.

SEX and AGE of 38 probable cases and DEATH and
RECOVERY figures.

TOTAL 38	DIED 21
FEMALES 28	„ 14
Ages—Under 5—4	„ 4
Years : 5 to 15—8	„ 5
„ 15 to 25—7	„ 2
„ 25 to 35—3	„ 1
„ 35 to 45—2	„ 2
„ 45 to 65—4	„ 0
	—
MALES 10	DIED 7
Age—Under 5—2	„ 2
Years : 5 to 15—6	„ 5
„ 15 to 25—1	„ 0
„ at 60—1	„ 0
	—

There is probable significance in the sex and age incidence.

The excess of Females requires explanation.

The death of 80% of children in whom Yellow Fever is considered to be mild is strange.

TABLE III.

LOCALISATION OF CASES.

Undefined	-	5
Refuge	-	1
Crawle	-	1
Rio Bueno	-	2
Falmouth	-	2
Brown Mountain	-	2
Calabar	-	4
Duncans	-	4
Stewarts Town	-	2
Carey Park	-	3
St. Andrew	-	2
St. Ann's Bay	-	2
Long Pond	-	1
Haddington	-	1
Dry Hill	-	2
New Carageen	-	1
Clarke's Town	-	1
Dr. Purchas	-	2

The locality deserves study in relation to many factors.

TABLE IV.

POST MORTEM EXAMINATION		20
STATE OF ORGANS—		
Liver—Enlarged	-	17
,, and Pale Yellow		5
,, and Purple with Yellow		
Areas		5
,, and with Pale Areas		1
,, and Purple		2
,, and gall bladder distended		4
,, and gall bladder empty		1
,, and fatty degeneration		4
,, and cloudy swelling		1
Kidneys—Congested	-	14
Supra renals enlarged		3
,, ,, ,, and congested		1
Tubercular nephritis		1
Pancreas—Enlarged	-	4
Heart—Large clot in R. Ventricle		4
,, ,, ,, ,, and up		
to pulmonary artery		3
Large clot in L. Ventricle		1
Lungs—Congested	-	20
Trachea and Bronchi full of		
blood-stained mucus		14
Meninges—Congested	-	3
Duodenum—Congested	-	6
With Worms		11
Stomach—Congested	-	20
Mostly (congested) at pyloric end		8
With specks or hæmorrhages		10
With coffee ground matter		7

That out of 73 cases investigated as Vomiting Sickness, 35 were readily diagnosable as due to some definite condition other than Yellow Fever shows a readiness on the part of the Medical Attendants to be chary in making a diagnosis in any case of Vomiting especially in childhood.

Variety of Diseases called Vomiting Sickness.

Some of the Medical Attendants have had intimate acquaintance with Yellow Fever and in past years have not hesitated to record its existence.

Medical men have seen Yellow Fever.

This certainly suggests that some disturbing element has been recently introduced to cause hesitancy of diagnosis before what must be admitted must have been an altered type of disease from that previously recognised as Yellow Fever.

New Element to disturb Diagnosis

That the Report will assert a diagnosis of Yellow Fever in only 17 of the remaining 38, shows hesitancy on the part of the Author to make any diagnosis in 21 cases of the 38 or in 56 per cent. of the cases assumed as possibly or probably Yellow Fever.

Report asserts Yellow Fever in only 17 out of 38 cases.

The Post Mortem records of the 17 cases reveal conditions which if taken alone might point to Yellow Fever, (although not necessarily not to certain other diseases); but when taken along with the record of Symptoms and course of the illness there can scarcely be said to be one Typical case of Yellow Fever. No Yellow Fever is definitely asserted of Survivors.

Post Mortem records are relied on, Symptoms are ignored

No attempt is made to consider any of the 38 cases in the light of Cerebrospinal Fever; and that no Bacteriological Examination is recorded with the view of eliminating or including this disease which on clinical evidence was repeatedly suggested is unfortunate.

Possibility of Cerebrospinal Fever not Investigated.

There are other diseases likewise that it behoved the Author of such a Report to take into consideration whose symptoms and pathology are sufficiently suggested by some of the cases under record to justify their recognition.

No evidence of attempt to eliminate possible Diseases.

The next Table 5 is to be added to Appendix E. of the Report and presents the symptoms, pulse and temperature, and length of illness, where recorded.

TABLE V.

CASE.	SEX & AGE.	LENGTH OF ILLNESS.	PULSE & TEMPERATURE, &c.	SYMPTOMS.
8	F. 19	3 days	—	Fever, pain in back & epigastrium. Better next day but relapsed at night, Vomit Yellow to Dark.
12	F. 29	27 hours	—	'Fever' for a few days, but kept at work. Vomit not described.
13	M. 6½	36 hours	—	Fever & bad feelings in belly, took food, only a few hours of acute illness, Vomit Yellow, Fits.
31	F. 7	15 hours	{ Deaths almost simultaneous }	Sent home from School where vomiting threatened took food, vomiting early morning, 3 hours a cute illness, vomit not described.
Sister and Brother.	M. 6	9 hours		Vomiting not described, convulsions.
35	F. 22	2 days	Subnormal Temp. 2nd day	Vomiting, Anuria, Coma, Albumen.
40	F. 45	12 hours	Subnormal Pulseless	Headache, pains in back, Anuria "fever" Coma.
41	M. 9	12 hours		Unconscious, no mention of vomit.
42	M. 6	24 hours	Temp. 104° to 104°. 120 to 110 pulse	Headache, 'fever,' vomiting, 'fits,' unconsciousness
47	F. 8	4 days		'Fever' & headache, no rigor.
48	F. 2	12 hours	24 hours later than 40 & 41 & of same family	Vomiting, fits, unconsciousness.
56	M. 15	3 hours		Vomiting, 'smothering' (fits?), coma.
58	F. 12	48 hours	Attended a niece who had similar symptoms & recov. 96° pulse 120	'Fever,' headache, backache, Vomiting Yellow to Dark, Coma
65	M. 10	12 hours		Abdominal pain, vomiting, unconsciousness, no albumen.
66	M. 1	3 hours		Vomiting of food, convulsions, unconsciousness
69	F. 12	3 days	Temp. 102°, 100 pulse	Headache, 'Fever,' vomiting, vomit Yellow.
70	F. 2	4 hours	Took ill on day of death of 69	Vomiting, 'Fit,' unconsciousness.

"Fever" means nothing or anything—No "Black Vomit"; no "Bloody Vomit"; extreme is "dark".

Study of these symptoms certainly suggests that the hitherto received teachings in regard to Yellow Fever have been either inaccurate or incomplete, if the symptoms detailed in the Report are to be taken as pathognomonic of Yellow Fever.

Clinical teaching in regard to Fever Symptoms absolutely at variance with the Symptoms detailed in Report.

The occurrence of such a series of aberrant cases without one typical case is practically impossible. There is no parallel in the descriptions of any epidemics large or small.

Added to this the post mortem record names Congestion of Lungs in all cases and Blood and Mucus in the air passages; and while the brain and cord are stated to be normal, the meninges were congested in three cases.

The significance of these and other facts will be later considered.

The Results of Blood Examination are of interest, but that in the present state of knowledge they are of any diagnostic value is doubtful. Until recently it was held there is no Mononuclear increase in Yellow Fever (Gray, B.M.J. Jany. 25/02); but later authorities seem to be decided that Mononuclear increase is present.

Blood Count Records perhaps of little diagnostic value.

The Lencocyte count varies so according to the moment of blood-sampling, that without all facts the diagnostic value of a count is impaired.

The pros and cons of this question are discussed by Seidelin in the Yellow Fever Bulletin for July, 1911, and he evidently prefers at that date to leave the matter open.

Some items favor, more negative a Yellow Fever diagnosis.

The most that may be said of the Blood Count is that it is indicative of a Protozoal Infection.

The absence of Polymorphonuclear Lencocytosis in the cases scheduled would be against a diagnosis of Cerebrospinal Fever for these cases. That is, if at this date it is still considered to be established that there is distinct Polymorphonuclear Lencocytosis in Cerebrospinal Fever.

The following table sets out the gross symptoms and morbid appearances of the cases on Record along with the same characters as described and accepted for Yellow Fever and Cerebrospinal Fever.

Symptoms and appearances compared.

TABLE VI

	CASES UNDER REPORT.	CEREBROSPINAL FEVER.	YELLOW FEVER.
Symptoms in brief	Acute onset. Temp. 102-104, Pulse 120-100 or Temp. Subnormal, Headache, Epigastric tenderness, Vomiting rarely hæmorrhagic. Convulsions comparatively frequent.	Temp. variable 99 to 105, Pulse quickened but variable, Vomiting, Convulsions. Variety of symptoms in prolonged cases. Kernig's Sign usual.	Acute onset, sometimes prodromata. Headache, pains in loins. Congested conjunctivæ and mucosa, Hæmorrhages from mucosa. Icterus after 3rd day. Epistaxis. Albuminuria 3rd day. Hiccough. Temperature 103, Faget's Sign. Tongue red, dry, central fur. 3rd day remission. Vomiting usually hæmorrhagic. Convulsions rare.
Fatal occurrence	3 hours to 4 days, average 24 hours.	Frequently within 24 hrs. sometimes prolonged.	Rarely before 3rd day. Usually later than 5th. Most cases that die do so in 2nd stage.
Stomach	Congestion some Hæmorrhage mucus & specks.	Usually altered.	Congestion & Hæmorrhages. Mucosa of tongue, mouth and pharynx bloody.
Intestines	Occasional congestion.	do.	Hæmorrhages.
Liver	Enlarged, Purple, Purple & Yellow, Yellow.	do.	Not usually enlarged. Boxwood colour, or mottled with congestion.
Kidneys	Congested or normal	do.	Congested.
Suprarenals	Sometimes enlarged and congested.	do.	Not usually affected.
Pancreas	Sometimes enlarged and congested.	do.	Usually normal.
Spleen	Normal	Normal.	Normal usually.
Brain, Cord and Meninges	Normal, Congested sometimes.	Congestion. Usually exuded lymph.	Rarely abnormal.
Heart	Large Clot in R. Ventricle.	Not usually affected.	Flabby. Myocardial hæmorrhage.
Lungs	Always congested & passages with blood & mucus	Congested. Pleurisy not unusual.	Hypostatic congestion usually in late death.

TICK FEVER (composite).

Acute onset, Headache. Vomiting Congestion of Conjunctiva & Icterus, scanty albuminous urine, Temp. 102-104, Pulse 110-120, sometimes a rash, Kernig's sign absent, Convulsions in children. No disparity between Temperature and Pulse.

Variable. No series of cases in which death within 24 hours was the rule is available.

Congestion and Hæmorrhages.

Congestion and Hæmorrhages.

Enlarged. Cloudy swelling and fatty degeneration.

Usually enlarged and Hæmorrhagic.

Enlarged and Congested

Usually enlarged.

Enlarged, soft and friable.

Congestion of Meninges.

Flabby. Clot in Right Ventricle.

Congestion. Mucus and blood in passages.

From Table 6 it is evident that the received morbid anatomy of Yellow Fever corresponds much more nearly with the appearances of the cases recorded in the Report than of cases of Cerebrospinal Fever, although the grouped symptoms of the Report cases as in Table 6 and the symptoms separately given in Table 5 correspond much more closely with the symptoms of Cerebrospinal Fever.

Morbid Anatomy resembles that of Yellow Fever Symptoms with those of Cerebrospinal Fever,

That certain cases of Cerebrospinal Fever have recently been Bacteriologically demonstrated in Kingston by Dr. Scott, Pathologist to the Government has placed beyond doubt that some cases called "Vomiting Sickness" (as these were) are really Cerebrospinal Fever.

Cerebrospinal Fever in Kingston,

But the discrepancy between the Clinical manifestations and the Morbid Anatomy of the Report cases requires explanation when the assumption that they are Yellow Fever is made. One assumes the faithfulness of the post mortem picture although the Report gives no evidence of skilled corroboration of detail; and one could not suggest a misreading of the appearances by an eye wishing to see the fulfilment of an expectation.

Discrepancy between Symptoms and signs requires explanation,

In one case from the Report, Dr. Scott is recorded as having made blood smears in which there is suggestion of the discovery of Protozoal bodies. It is unfortunate that at the time no examination seems to have been made to detect the Bacillus of Cerebrospinal Fever in cases whose symptoms correspond to those of cases of Cerebrospinal Fever recently investigated.

Presence of Protozoal bodies suspected in one case,

No search for the Bacillus of Cerebrospinal Fever,

Although smears were made in other cases this case alone gave suggestion of protozoa.

Now there are groups of diseases—the various forms of piroplasmosis and Spirochaetosis, Texas Fever, Rocky Mountain Fever, various Relapsing Fevers—certain of the Symptoms of which and the morbid anatomy, combine more or less to an approximation to the symptoms and morbid anatomy of the cases under Report.

Piroplasmosis, Spirochaetosis and other Protozoal Diseases require to be eliminated,

True there are discrepancies: but the literature of these various diseases though already voluminous has not all been collated, nor has accuracy of investigation in all as yet been possible.

Symptoms and Morbid Anatomy of these roughly harmonise with those of Report cases.

It is unfortunate to suggest more possible causes for the "Vomiting Sickness" of Jamaica, but I believe the absence of any of these diseases deserves to be demonstrated.

Ticks and bugs are the intermediate hosts in these infections. Various species of ticks of the sub-family Ixodoidea have been proved to be carriers of forms of Piroplasmosis that infect Animals and infect or may infect Man.

Ticks, Bugs, and Animal and Human Vermin in general,

Ticks of Jamaica.

According to Newstead (Annals of Tropical Medicine, Volume 3, No. 4) at least 9 species of Ticks are found in Jamaica. *Argus persicus* (Chicken Fever tick), *Margaropus australis* (Texas Fever tick), *Dermacentor nitens* (Horse tick) *Rhipicephalus sanguineus* (on ox, dog, horse, pig, (?)) *Amblyomma Cajanense* (silver tick), attacking any animal almost and the commonest to bite man. *Amblyomma maculatum*, *A. dissimile*, and *Aponomma*.

These ticks are all more or less readily recognisable and should be located by any investigator.

That disease in man may be caused by certain of these ticks or by ticks more recently introduced is legitimate supposition.

The winter months—October or November to March or April—are given as the season during which Ticks are said to be most abundant (NEWSTEAD). December to March is believed to be the season for the occurrence of Vomiting Sickness. No cause has been assigned for this seasonal occurrence of the disease or diseases.

Negation a step towards affirmation,

I suggest that the exclusion of the possibility of Tick Fevers should be part of the investigation of "Vomiting Sickness". To know what a thing is not, is to be nearer knowing what it is.

Tick Countries have Tick Fevers,

From my general Hygienic and Special Tropical Medicine instruction at home I gained the impression (perhaps wrongly) that all countries that harboured Ticks had Tick Fevers in both man and animal. Other countries have both, and it would be surprising if in Jamaica, only animals are affected by Tick borne diseases.

The accurate mapping of the Tick distribution and the localisation of the various Ticks within the Island are called for in any attempt to elucidate obscure disease. Many other factors affecting the life of the people require also specific investigation.

Distribution of *Stegomyia Fasciata*,

I have had in preparation for sometime, a consideration of distribution of *Stegomyia fasciata* in Jamaica in relation to the absence of Yellow Fever, and have been prevented completing it by lack of time and opportunity to make myself personally acquainted with conditions in the Island other than in Kingston and St. Andrew.

Argument against Endemicity of Yellow Fever in Jamaica,

I take this opportunity however of suggesting briefly a few reasons for the assumption of the absence of Endemic Yellow Fever in Jamaica.

In the absence of definitely Typical cases over a period of years it may be that all cases have been stamped out and re-importation has not taken place.

Stegomyia fasciata is limited in town, but the extent of limitation necessary to exclude endemicity is not readily demonstrable. At the same time assuming the correctness of the evidence that goes to show that only in the first three days of an attack of Yellow Fever can the *Stegomyia* receive infection from man, and that 13 days elapse before the *Stegomyia* can re-infect man, it is arguable that it need not be a great limitation of *Stegomyia* that is required to eliminate Yellow Fever from an insular community.

The nature of the shipping of Jamaica in recent years and the Quarantine methods in force render it difficult for Yellow Fever to be imported, and the possibility of the introduction of infected *Stegomyia* is so remote as to be negligible.

Since the last recorded outbreak of Yellow Fever in the Island there has been ample introduction and birth of susceptibles in the Island to have allowed opportunity for the occurrence of Typical cases of Yellow Fever in the Island, and there is no record of any.

Tourists travel freely throughout the Island; Syrians (who are carried off with Yellow Fever in West Africa) enter the houses of the people throughout the whole of the Island: Chinamen have their shops everywhere amongst the people and there is no reason to assume their immunity. The people come daily to Kingston from a country radius of about 20 miles, and assuming endemicity there should be mild cases capable of spreading infection amongst the many susceptibles of the city if capable of maintaining endemicity in the country parts.

The seasonal prevalence of "Vomiting Sickness" in the cold months is marked; while the *Stegomyia* though certainly more abundant after rains is in evidence all the year round.

Seasonal occurrence of Yellow Fever is especially in the hot months according to records of Epidemic.

The last epidemic of Yellow Fever in 1897 was an occurrence of Typical Yellow Fever within the experience of many general practitioners still in the Island.

The Death Returns show that it was chiefly centred in Kingston and other Urban districts where most susceptibles might be expected and where infection would be more readily effected.

The few cases that occurred in Kingston in 1904, were Typical Yellow Fever in adults, were imported probably from Central America, and were limited to a directly associated group of young adult males.

That Yellow Fever is not now endemic in the Island may require to be proved; but its absence in Typical form from

Kingston where must be thousands of susceptibles resident, and where thousands more migrant susceptibles yearly still get wholesomely bitten by *Stegomyia fasciata* is suggestive of at any rate extremely discrete endemicity.

SUMMARY. —

There is no typical case of Yellow Fever recorded in the Report.

To quote Seidelin (Yellow Fever Bulletin, Sept., 1911) ".....cases may occur the nature of which (clinically) cannot be proved beyond doubt to everybody concerned. Theoretically, the same conditions prevail at the post mortem examination, but in practice the situation is less unfortunate because *nearly all fatal cases are typical.*"

A great mass of evidence is totally neglected both in support of the Yellow Fever theory and in exclusion of other possibilities.

The Clinical Symptoms and Signs are quite atypical of Yellow Fever and more resemble the Symptoms of Cerebrospinal Fever.

Not a Typical Case.

The post mortem appearances (excluding enlarged liver, which is not characteristic of Yellow Fever, and the state of the lungs and air passages) somewhat resemble the post mortem appearances in Yellow Fever, *but there is not one typical case.*

Piroplasmosis or allied Disease possible.

The conjunction of Symptoms and Signs Clinically, and the post mortem appearances bear a strong resemblance to diseases of the Piroplasmosis and Spirochætosis Groups, which are probably mainly spread by Ticks, Bugs or body vermin.

Cerebrospinal Fever undoubtedly covers some cases of 'Vomiting Sickness.'

Cerebrospinal Fever has long been recognised in Jamaica as one cause of "Vomiting Sickness" and the Bacteriological verification of this Clinical Diagnosis is satisfactory.

The recently demonstrated presence of Cerebrospinal Fever in Kingston, however does not explain all cases of "Vomiting Sickness" in country parts. Further investigation may enlarge the area of proof of Cerebrospinal Fever, but there are indications that the cases recurring in about the same spots in the country may be a different disease. The post mortem appearances of Cerebrospinal Fever do not correspond to the appearances recorded in the Report.

The possibility of a specially fulminant Cerebrospinal Fever due to direct blood inoculation by blood-sucking vermin cannot be left out of consideration.

If Yellow Fever is endemic in Jamaica it is more probably to be ascertained from careful investigation of cases of "Malignant Malaria" which still sporadically occur.

In support of the theory that a Tick Fever may account for certain cases of "Vomiting Sickness" I should expect—

(1) That the time when difficulty in Diagnosis gave rise to the term "Vomiting Sickness" corresponded to a period shortly succeeding the introduction of Ticks or a specifically infected Tick to the Island:

(2) That these cases occur in localities where a specific Tick should be demonstrated.

(3) That the specific Tick is probably parasitic on some domestic animal or several, especially Pig, Goat, Dog or Fowl.

(4) That the localisation and seasonal occurrence of "Vomiting Sickness" would correspond to the localisation and seasonal abundance and breeding period of the specific Tick, and

(5) That Tick infections are present in domestic animals.

The Symptoms and Mordid Anatomy of a composite of "Tick Fevers" is placed for comparison with those detailed of "Vomiting Sickness" in Table 6.

Symptoms and signs of
'Tick Fevers.'

It may be unscientific to present a "composite" disease, but the acknowledged insufficiency of accurate detailed report and investigation so far of these diseases is my excuse.

It seems to me that the persevering investigation of local investigators under capable direction, so that not the mere discovery of a Bacillus, but the exhaustive recording of a wide series of facts, is to be the plan of campaign, is the wisest means of attempting to unravel a skein which the Report of Captain Potter has made more, rather than less unravelled.

Investigation by
strengthened local
Staff of more value
than Special Com-
mission.

That such work should be part of the routine work of the Health Department of the Island is likely to lead to most good, by enlisting the services and suggestions of all the profession.

Routine work of Health
Department of Island

ANGUS MACDONALD.

23RD NOVEMBER, 1912.



